

Precision Investment Casting 1098

in various branches of industry in the USSR. Attention is given to rational working methods and to the latest developments in investment casting techniques and also to modern equipment and safety technique. Problems of increasing the quality of castings and measures for eliminating rejects in all basic operations are discussed in detail. The basic technical and economic indices are given and the advantages of investment casting are discussed. No personalities are mentioned. There are 21 Soviet references.

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MAKSIMOV, A.I., inzh.; SOROKIN, P.V., inzh.; VEIDENKIN, S.G., prof.

Effect of active gas media on the lasting strength of  
austenitic steel castings. Trudy TSNITMASH 92:139-157  
'59. (MIRA 12:8)

(Steel--Corrosion)

MAKSIMOV, A.I., inzh.; ~~SOROKIN, P.V.~~, inzh.; DAVIDOVSKAYA, Ye.A.; kand.  
tekhn.nauk; ~~VEDENKIN, S.G.~~, prof.

Long-time strength of austenite steels in fuel combustion  
products and in superheated steam. [Trudy] TSNITMASH  
100:70-89 '59. (MIRA 13:7)  
(Heat-resistant alloys)

SOROKIN, P.V.; NALIVAYKO, Ya.I.

Making hollow patterns for investment casting with use of compressed  
gas liquid. Lit.proizv. no.7:41 Je '60. (MIRA 13:7)  
(Patternmaking--Equipment and supplies)  
(Precision casting)

MAKSIMOV, A.I.; SOROKIN, P.V.; FEDOSOV, A.I.

Device for corrosion-erosion testing of heat-resistant materials  
in combustion products of liquid fuels. Zav.lab. 27 no.10:1311-  
1312 '61. (MIRA 14&10)

1. TSentral'nyy nauchno-issledovatel'skiy institut tekhnologii i  
mashinostroyeniya.  
(Liquid fuels) (Testing machines)

SUBJECT USSR / PHYSICS CARD 1 / 2 PA - 1744  
AUTHOR SOROKIN, P.Y., TARANOV, A.JA.  
TITLE The Polarization of Protons Elastically Scattered by  $C^{12}$ -Nuclei.  
PERIODICAL Dokl. Akad. Nauk, 111, fasc. 1, 82-84 (1956)  
Issued: 1 / 1957

I.T. DJATLOV and L.N. ROZENCVEJG (in connection with work carried out by the physical department of the physical-mathematical faculty of the State University "A.M. GOR'KIJ", No 6, 81 (1955)) showed that scattered protons are partly polarized, and they computed curves for the dependence of polarization  $P$  on the energy of the protons at different scattering angles. The present report deals with the experimental examination of these results, and furthermore the correctness of the phase analysis by H.L. JACKSON and A.I. GALONSKIJ, Phys. Rev. 89, 370 (1953) is checked. The apparatus used for measuring the degree of polarization  $P$  is discussed on the basis of a drawing. The protons, which are accelerated by means of an electrostatic generator, pass through a system of collimator openings and then impinge upon a solid carbon target. The amperage of the primary bundle is measured by means of a FARADAY cylinder and a current integrator. The scattered protons then impinge on an analyzer filled with helium (40 cm mercury column). The protons scattered by  $He^4$  can then impinge on two proportionality counters. The rather powerful analyzer can indicate the polarization of proton bundles with the intensity of  $10^4$  proton/sec. The formula for azimuthal asymmetry is given. For the intensity ratio at  $\varphi = 0^\circ$  and at  $\varphi = 180^\circ$  it applies that

SOROKIN, P. V. Cand Phy-Math Sci--(diss) "Study of the  
polarization of protons, elastically <sup>scattered</sup> ~~dispersed~~ by ~~the nuclei~~  
 $\text{He}^4$ ,  $\text{C}^{12}$  and  $\text{O}^{16}$  <sup>nuclei."</sup> Khar'kov, 1957. 9 pp 22 cm. (Min of Higher  
Education UkSSR. VV Kharkov: Center of Labor Red Banner State  
Univ im A.M Gor'kiy, 1960. 100 copies. Bibliography: p 9(11 names)  
(KL, 23-57, 108)

-1-//

SCROKIN, P. V., MAN'KO, V. I. KARAD'YEV, K. V., GAVRILOVSKY, B. V.,  
TARANOV, A. Ya. and VAL'TER, A. E.

"Polarization of Protons Scattered by  $O^{16}$  Spin and Parity of the 3,11 Mev  
Level of the  $F^{17}$  Nucleus,"

paper submitted at the A-U Conf. on Nuclear Reactions in Medium and Low Energy  
Physics, Moscow, 19-27 Nov 57.

Acad. Sci. USSR & Physico-Tech. Inst. Acad. Sci. . Ukr SSR



SOROKIN, P. V., TARANOV, A. Ya., VAL'TER, A. K.,

"Investigation of Polarization of Protons Elastic Scattered from  $C^{12}$ "

Physical Technical Inst. Acad. Sci. Ukr SSR

paper submitted at the A-U Conf. on Nuclear Reactions in Medium and Low Energy  
Physics, Moscow 19-27 Nov 1957.

AUTHORS: Val'ter, A. K., Malakhov, I. Ya., Sorokin, SOV/48-22-7-22/26  
P. V., Taranov, A. Ya.

TITLE: Elastic Scattering of Protons on  $\text{Si}^{28}$  Nuclei. Spin and Parity of the Levels of 4,31 and 4,73 MeV of the  $\text{p}^{29}$  Nucleus (Uprugoye rasseyaniye protonov yadrami  $\text{Si}^{28}$ . Spin i chetnost' urovney 4,31 i 4,73 MeV yadra  $\text{p}^{29}$ )

PERIODICAL: Izvestiya Akademii nauk SSSR, Seriya fizicheskaya, 1958, Vol. 22, Nr 7, pp. 871 - 876 (USSR)

ABSTRACT: The scattering cross-section of the reaction  $\text{p} - \text{Si}^{28}$  was measured in order to establish the characteristics of the excited states of the  $\text{p}^{29}$  nucleus. These states are connected with the resonance mentioned in reference 1. The method of measurement is described first. The proton beam was accelerated in the electrostatic generator of the Physical-Technical Institute of the AS Ukr SSSR. It is deflected by  $90^\circ$  by a magnetic analyzer. It then passes through a system of collimating diaphragms with a diameter of 2 mm and strikes a silicon target. From the qualitative analysis it is ascertained, that the level of 4,31 MeV can have a spin and a parity of  $3/2^-$  or  $1/2^-$ . The

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Elastic Scattering of Protons on  $\text{Si}^{28}$  Nuclei. Spin and SOV/48-22-7-22/26  
Parity of the Levels of 4,31 and 4,73 MeV of the  $\text{p}^{29}$  Nucleus

determination of the spin and the parity for the level of  $1/2^+$  with 4,73 MeV is beyond doubt. For a final determination of the spin of the 4,31 level the computed curves were compared with the experimental results. In order to compute the scattering cross-section of the reaction  $\text{p} - \text{Si}^{28}$  in the range from 1,6 to 2,2 MeV data from reference 5 were used. The cross-section was computed according to formulae (1), (2) and (3) without assuming a dependence of the phases on the energy. The maximum divergence between the experimental points and the computed curves did not exceed 25%. As a summary it is stated, that the resonance half-widths found experimentally, 50 and 14 keV, differ considerably from the values found in reference 1, 60 and 25 keV. The results of the phase analysis are exposed. The ratio of the given level-widths and the quantity

$$\frac{3\hbar^2}{2ma}$$

shows that the level of 4,31 MeV apparently is a single-stage level whereas the 4,73 MeV level is connected with a much more complicated mechanism of excitation. The evidence

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Elastic Scattering of Protons on  $\text{Si}^{28}$  Nuclei. Spin and SOV/48-22-7-22/26  
Parity of the Levels of 4,31 and 4,73 MeV of the  $\text{p}^{29}$  Nucleus  
APPROVED FOR RELEASE: 08/23/2000 CIA-RDP86-00513R001652510012-8"

concerning the spins and parities of these levels substantiate the preliminary experimental results of proton polarization in an elastic scattering of  $\text{p}$  on  $\text{Si}^{28}$ . There are 9 figures, 1 table, and 5 references, 0 of which is Soviet.

ASSOCIATION: Fiziko-tehnicheskii institut Akademii nauk USSR (Physical and Technical Institute, AS Ukr SSR)

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The Polarization of Protons Elastically Scattered on  $\text{Si}^{28}$  Nuclei SOV/56-35-6-10/44

references 6 and 7. The experiments were carried out on the electrostatic generator of the FTI AN USSR (Physico-Technical Institute, AS UkrSSR). Results are given by table 2, viz. for the scattering angles  $\theta$  (in the center of mass system) of  $60^\circ$  and  $90^\circ$  for the following  $E_p$ -values: 1.7, 1.75, 1.8, 1.85, 2.0, 2.05, 2.10, 2.15. The experimentally determined polarization values agree with calculated values (which are also given by this table) within the error limits. The functions  $P(E_p)$  are given in form of diagrams in figure 1 (for  $\theta = 60^\circ$ ) and in figure 2 (for  $\theta = 90^\circ$ ); a second ordinate shows the corresponding cross sections  $\sigma(E_p)$ , which were obtained as the results of a phase shift analysis. Two fully analogous diagrams are shown by figures 3 and 4, viz. for  $\theta = 125^\circ$  and  $150^\circ$  respectively. There follows a short discussion of results. There are 4 figures, 2 tables, and 7 references, 3 of which are Soviet.

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SOV/56-35-6-10/44

The Polarization of Protons Elastically Scattered on  $\text{Si}^{28}$  Nuclei

ASSOCIATION: Fiziko-tekhnicheskiy institut Akademii nauk Ukrainskoy SSR  
(Physico-Technical Institute of the Academy of Sciences,  
Ukrainskaya SSR)

SUBMITTED: July 5, 1958

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SOV/58-59-7-14796

21.5300

Translation from: Referativnyy Zhurnal Fizika, 1959, Nr 7, pp 32 - 33 (USSR)

AUTHORS: Sorokin, P.V., Val'ter, A.K., Taranov, A.Ya.

TITLE: Measurement of Proton Polarization<sup>19</sup> by Means of a Helium Analyzer<sup>19</sup>

PERIODICAL: Uch. zap. Khar'kovsk. un-t, 1958, Vol 98, Tr. Fiz. otd. fiz.-matem. fak., Vol 7, pp 119 - 135

ABSTRACT: The authors describe the development of an instrument for measuring the polarization of protons that have been elastically scattered by nuclei. The instrument consists of a scattering chamber and a helium analyzer. Owing to its large "aperture ratio", the instrument can be utilized to measure the polarization of low-intensity beams ( $10^4$  protons/sec). Experiments in double proton-He<sup>4</sup> scattering, as well as measurements of the polarization of protons elastically scattered by Cl<sup>35</sup> nuclei, have shown that the instrument permits the measurement of polarization degrees in excess of 3 to 5% for protons resulting from reactions with a cross section of  $10^{-25}$  cm<sup>2</sup> . sterad<sup>-1</sup>. The reactions in question occur in targets containing  $10^{19}$  nuclei/cm<sup>2</sup> at a primary current of  $1 \mu$  amp.

The authors' résumé

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24(5),21(7)  
AUTHORS:

SOV/48-23-7-12/31  
Val'ter, A. K., Deyneko, A. S., Malakhov, I. Ya., Sorokin, P. V.,  
Taranov, A. Ya.

TITLE:

The Elastic Scattering and the Radiation Capture of Protons by  
 $N^{14}$ -Nuclei (Uprogoye rasseyaniye i radiatsionnyy zakhvat  
protonov yadrami  $N^{14}$ )

PERIODICAL:

Izvestiya Akademii nauk SSSR. Seriya fizicheskaya, 1959,  
Vol 23, Nr 7, pp 839-845 (USSR)

ABSTRACT:

It is pointed out in the introduction that the investigations of  
the elastic scattering of the protons by  $N^{14}$ -nuclei were carried  
out by studying the levels of the  $O^{15}$ -nuclei, and a number of  
papers (Refs 1-7) are pointed out in this connection. In another  
paper (Ref 8), the reaction  $N^{14}(p, \gamma)$  was investigated, and the  
results of these papers are shown in diagrams (Figs 2 and 3).  
In the present paper, the elastic scattering cross section is  
investigated in the energy range of 1.7 - 3.5 Mev. The measuring  
instrument used in these investigations is shown in figure 1,  
and the proton beam was generated by the electrostatic generator

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The Elastic Scattering  
and the Radiation Capture of Protons by  $N^{14}$ -Nuclei

SOV/48-23-7-12/31

of the FTI AS UkrSSR. The elastic scattering cross section of the protons on  $N^{14}$ -nuclei was measured under the angles 54, 90, 141 and 154°, and the results are shown in diagrams (Figs 2-6). The curves  $\sigma(E_p)$  show six narrow resonances and one wide resonance at 2.4 Mev. In order to determine the width of the levels, the value of the resonance energy was accurately determined, it was investigated ~~how much~~ the proton beam is monoenergetic, and the reaction  $N^{14}(p, \gamma)$  was studied. An experimental width of resonance of 7.5 kev was measured. The relative  $\gamma$ -yield was investigated in the resonance range of 1.8, 2.35 and 2.48 Mev, and the results are shown in 2 diagrams (Figs 7 and 8). By comparing the widths of the resonances thus obtained with the corresponding values for the resonance in the elastic scattering cross section, it becomes clear that the energetic scattering of the protons does practically not depend on the energy, and that the latter amounts to about  $\pm 8$  kev. This determines the widths of the levels in the elastic scattering cross section at 17 and 40 kev, respectively. The levels of

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The Elastic Scattering  
and the Radiation Capture of Protons by  $N^{14}$ -Nuclei

SOV/48-23-7-12/31

the  $O^{15}$ -nuclei are compiled in table 2, and it is ascertained that the results obtained are in good agreement with those obtained by other authors. The authors thank M. I. Gusev for the preparation of the  $N^{14}$ -target by the electromagnetic separator, and A. A. Tsygikalo and Yu. A. Kharchenko and the staff for the operation of the electrostatic generator. There are 8 figures, 2 tables, and 10 references, 1 of which is Soviet.

ASSOCIATION: Fiziko-tekhnicheskiy institut Akademii nauk USSR (Physico-technical Institute of the Academy of Sciences, UkrSSR)

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24(5),21(7)

SOV/48-23-7-13/31

AUTHORS: Val'ter, A. K., Malakhov, I. Ya., Sorokin, P. V., Taranov, A. Ya.

TITLE: Elastic Scattering of the Protons by  $\text{Ar}^{40}$ -Nuclei  
(Uprogoye rasseyaniye protonov yadrami  $\text{Ar}^{40}$ )

PERIODICAL: Izvestiya Akademii nauk SSSR. Seriya fizicheskaya, 1959,  
Vol 23, Nr 7, pp 846-848 (USSR)

ABSTRACT: In the introduction, it is ascertained that the investigation of the elastic scattering of the protons by  $\text{Ar}^{40}$ -nuclei is carried out by studying the levels of the  $\text{K}^{41}$ -nuclei. A non-Russian paper is indicated (Ref 2) in which weak resonances were determined at the energies of 1.9 and 2.48 Mev; the values put forward are, however, considered inaccurate to obtain a survey of the spins and parities of the respective levels. The experiments described in the present paper were carried out with the same instrument as the experiments described in the previous paper of this issue. The elastic scattering cross section was recorded under the angles of 90, 125 and 150° in an energy range of 1.7 to 2.7 Mev. As the diagrams of

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Elastic Scattering of the Protons by  $\text{Ar}^{40}$ -Nuclei

SOV/48-23-7-13/31

figures 1, 2 and 3 show, two weak resonances can be observed in the elastic scattering cross section at  $E_p = 1.86$  and  $2.45$  Mev, and further a number of resonances at energies over  $2.5$  Mev. A comparison of the experimental data with the data computed, as well as a determination of the widths of the levels, are not possible. It is further ascertained that the reaction  $\text{Ar}^{40}(p,n)\text{K}^{40}$  is only realized by protons with the orbital momentum  $l = 3$  or  $l = 5$ . Finally, the distance of the levels in the  $\text{K}^{41}$ -nuclei is evaluated, and is indicated with  $20$  kev at an excitation energy of  $10$  Mev. There are 3 figures and 6 references, 2 of which are Soviet.

ASSOCIATION: Fiziko-tekhnicheskiy institut Akademii nauk USSR  
(Physico-technical Institute of the Academy of Sciences, UkrSSR)

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SOROKIN, P.V. (USSR)

"Resonance Scattering of Protons by Light Nuclei"

report submitted for the 2nd USSR Conference on Nuclear Reactions at Low and Intermediate Energies, Moscow, 21-28 July 1960.

85593

S/048/60/024/007/027/032/XX  
B019/B056

24.6600

AUTHORS:

Val'ter, A. K., Deyneko, A. S., Sorokin, P. V., and  
Taranov, A. Ya.

TITLE:

The Elastic Scattering of Protons by  $\text{Ne}^{20}$  Nuclei  
79 79

PERIODICAL:

Izvestiya Akademii nauk SSSR. Seriya fizicheskaya, 1960,  
Vol. 24, No. 7, pp. 884-886

TEXT: This paper was read at the 10th All-Union Conference on Nuclear Spectroscopy, which took place from January 19 to January 27, 1960 at Moscow. As a target, gaseous neon (90.5%  $\text{Ne}^{20}$ ) at a pressure of 5 torr was used in the measurements described. The cross section was measured at angles of 55, 90, 125, 141, and 151° in the center-of-mass system. The proton energy was varied in the range of from 1.6 - 3.4 Mev. The heterogeneity of the radiation was  $\pm 8$  kev. From the results shown in Figs. 1 and 2, five well-marked resonances may be seen. In the first column of the Table, the proton energies, in the second column the energies of the corresponding  $\text{Na}^{21}$  levels, in the third the level widths according to data by Heaberli (Ref. 2) and according to data obtained by the authors a

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The Elastic Scattering of Protons by  $\text{Ne}^{20}$   
Nuclei

S/048/60/024/007/027/032/XX  
B019/B056

given. Furthermore, the spins and parities are given. The latter were obtained by a phase shift analysis. As shown by an investigation of the polarization of the protons scattered by  $\text{Ne}^{20}$  nuclei at an angle of  $90^\circ$ , the polarization in the energy range of from 1 - 1.8 Mev attains 70% (Fig. 3). There are 3 figures, 1 table, and 7 references: 3 Soviet, 3 US, and 1 Dutch.

Резонансные энергии протонов и характеристики уровней  $\text{Na}^{21}$

| $E_p$ , MeV | Энергия уровня ядра $\text{Na}^{21}$ , MeV | Ширина уровня $\Gamma$ , keV |               | Спин и четность | $\frac{\Gamma_p}{\Gamma}$ | Приведенная ширина $\gamma^*$ , MeV см |
|-------------|--|------------------------------|---------------|-----------------|---------------------------|--|
|             |  | по нашим данным              | по данным [2] |                 |                           |  |
| 1,81        | 4,18                                       | 121                          | 180           | 3/2-            |                           | $1,4 \cdot 10^{-13}$                   |
| 1,96        | 4,32                                       | 17                           | 6             | 5/2+            | 0,25                      | $0,8 \cdot 10^{-13}$                   |
| 2,15        | 4,50                                       | 27                           | 17            | 3/2+            | 0,84                      | $0,9 \cdot 10^{-13}$                   |
| 2,69        | 5,02                                       |                              |               |                 |                           |  |
| 3,18        | 5,48                                       | 80                           | 110           | 1/2+            |                           | $0,2 \cdot 10^{-13}$                   |

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B019/B056

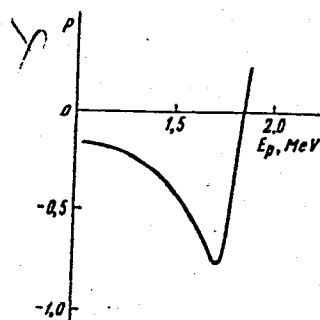


Рис. 3. Поляризация протонов,  
рассеянных ядрами  $\text{Ne}^{20}$  под  
углом  $90^\circ$

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S/048/60/024/007/010/011  
B019/B060.

26.2260  
AUTHORS;

Deyneko, A. S., Popov, A. I., Sorokin, P. V.,  
Taranov, A. Ya.

TITLE:

A Magnetic Spectrometer With Double Focusing

PERIODICAL:

Izvestiya Akademii nauk SSSR. Seriya fizicheskaya, 1960,  
Vol. 24, No. 7, pp. 924-928

TEXT: This is the reproduction of a lecture delivered at the 10th All-Union Conference on Nuclear Spectroscopy held in Moscow from January 19 to 27, 1960. The spectrometer described here, which has a magnetic field in sector form, is intended for the study of nuclear reactions brought about by electrostatic accelerators. Since the energy of the products resulting from the nuclear transformations examined with this spectrometer do not exceed 8 Mev, it was not necessary for the  $H_0$  to exceed  $4 \cdot 10^5$  oe.cm. A homogeneous field with 15,000 oe was easily attainable in the not very large gaps. The radius of curvature of the particle path was found to be 320 mm. The distance from the target to the magnetic field entrance is 400 mm, and it is therefore possible to study the distribution of the

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A Magnetic Spectrometer With Double Focusing

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B019/B060

nuclear reaction products at an angle of  $0 - 150^\circ$ . The distance between the photographic state and the point of exit of the particles from the magnetic field is 700 mm. Fig. 2 shows a view of the spectrometer. The magnet core is made of Armco iron, while the water-cooled magnetizing coils are wound on copper bars. The resistance of the coils connected in series is 1.38 ohms, the maximum power consumption is 2.2 kw. The magnetizing current is stabilized to within an accuracy of 0.05%, and the magnetic field can be regulated between 2 and 15 koe. The proton energies which the spectrometer is capable of recording are in the range of 0.2 and 8 Mev. The spectrometer testing is dealt with in great detail. Fig. 3 shows the magnetic field strength as a function of the coil current. Thorough investigations revealed that the topography of the magnetic field does not change with rising magnetic field strength, and 0.3% is given as the maximum deviation of the field on the strength of the particle path. The maximum inhomogeneity is 0.03% per centimeter. Fig. 4 shows the resolving power as a function of the distance of the detector from the point of exit of the particle out of the magnetic field. The best resolution is at 686 mm, which is in good agreement with the projected distance of 700 mm. Fig. 5 shows line shapes of  $\alpha$ -particles, as were determined with a scintillation counter

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A Magnetic Spectrometer With Double Focusing S/048/60/024/007/010/011  
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and a photographic plate. The half-widths are 0.15 and 0.16%, respectively. It may be seen from these results that the spectrometer described here meets the demands made on it satisfactorily. There are 5 figures and 6 non-Soviet references.

ASSOCIATION: Khar'kovskiy fiziko-tekhnicheskii institut Akademii nauk  
USSR  
(Khar'kov Institute of Physics and Technology of the  
Academy of Sciences UkrSSR)

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S/120/61/000/006/039/041  
E032/E514

AUTHORS: Andreyev, G.B., Deyneko, A.S., Malakhov, I.Ya.,  
Sorokin, P.V. and Taranov, A.Ya.

TITLE: Production of thin  $\text{Al}_2\text{O}_3$  films

PERIODICAL: Pribery i tekhnika eksperimenta, no.6, 1961, 149-150

TEXT: The aim of this work was to produce  $\text{Al}_2\text{O}_3$  backing films having a thickness of less than  $0.1 \mu$  for targets evaporated onto them in vacuum. Such targets are suitable for scattering experiments in nuclear physics. The films are prepared as follows. A  $40 \mu$  aluminium foil is first etched in a 30% solution of NaOH in order to clean the surface from contamination. When a thickness of about  $3 \mu$  has been reached the foil is oxidised for 2 to 3 min in a bath containing an electrolyte which consists of 1.5% (by weight) of acetic acid and 1.5% of aluminium acetate. The cathodes in the electrolytic bath are two aluminium plates and the foil to be oxidised serves as the anode. The initial current density is varied between 1 and 100 mA and the final oxidation voltage between

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21.6000  
AUTHORS:

Zubritskiy, L. A., Popov, A. I., Sorokin, P. V., and  
Samoylov, V. F.

TITLE:

Semiconductor spectrometers of charged particles

PERIODICAL:

Akademiya nauk SSSR. Izvestiya. Seriya fizicheskaya,  
v. 25, no. 10, 1961, 1286 - 1290

TEXT: The authors constructed a series of germanium and silicon spectrometers. They investigated the properties of these spectrometers by means of  $\alpha$ -particle radiation from a  $Po^{210}$  source. The voltage pulses obtained from the detector were amplified by a linear amplifier and analyzed by means of a 100-channel pulse analyzer of AM-100 (AI-100) type. In germanium spectrometers, n-type germanium with a resistivity of 40-45 ohm-cm is used. A surface-barrier p-n junction was produced by sputtering gold on the germanium surface. The germanium plates (5.5x1 mm) were etched in an CP-4 (SR-4) solution to obtain a regular reflecting surface. The crystal was mounted in a crystal-holder. A small amount

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Semiconductor spectrometers...

of indium soldered to the upper surface of the crystal produced a p-n junction. The construction is shown in Fig.1. The spectrometer was investigated at nitrogen temperature. The volt-ampere characteristic of the gold-germanium spectrometer described here is better than that of the spectrometer described by M. L. Halbert and J. L. Blankenship (Nucl. Instr. and Method., 8, 106 (1960)). If the voltage on the junction is between 10 and 30 v the resolving power of the spectrometer is  $< 0.5\%$ . In silicon spectrometers, n-type silicon with a resistivity of 100 ohm-cm is used. By sputtering boron on silicon plates (4.4x1 mm, 1200°C, diffusion depth of boron  $\leq 1\mu$ ) a p-n junction is produced. After finishing the diffusion process the p-layer is etched. The crystal is fixed in a tantalum crystal holder. An aluminum contact is soldered to the p-layer. The construction of the silicon instrument is the same as that of the germanium instrument. The silicon spectrometer was investigated at room temperature and nitrogen temperature. At room temperature the resolving power of the spectrometer is 3% (if the voltage on the junction is between 5 and 10 v). At nitrogen temperature, the resolving power of the silicon spectrometer is 2.5% (voltage on the junction between 50 and 180 v). Up to a voltage of 200 v, the current

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Semiconductor spectrometers...

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is weaker than  $0.01 \mu a$ . The effective thickness of the sensitive layer at 30 v is  $55\mu$ . It prevails over the thickness of the volume charge of the p-n junction ( $28\mu$ ). The authors thank A. K. Val'ter and A. Ya. Taranov for cooperation. There are 9 figures and 7 non-Soviet references. The three most recent references to English-language publications read as follows: Amsel G., Baruch P., Smulkowsky O., Nucl. Instr. and Method, 8, 92 (1960); Fridland S., Mayer J., Wiggins J., Nucleonics, 18, 2, 54 (1960); Almen E., Larsh, G. E., Gordon, T., Sikkeland, Rev. Scient. Instrum., 31, 10, 1114 (1960).

ASSOCIATION: Fiziko-tekhnicheskii institut Akademii nauk USSR (Physico-technical Institute of the Academy of Sciences UkrSSR),  
Khar'kovskiy gos. universitet (Khar'kov State University)

Card 3/4

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SOROKIN, P.V.; POPOV, A.I.; STORIZHKO, V.Ye.; TARANOV, A.Ya.

Inelastic scattering of protons by  $\text{Ne}^{20}$  nuclei. Zhur. eksp.  
i teor. fiz. 40 no.5:1253-1256 My '61. (MIRA 14:7)

1. Fiziko-tekhnicheskiy institut AN Ukrainskoy SSR.  
(Protons—Scattering)  
(Neon—Isotopes)



24,6600

40103  
S/048/62/026/008/019/028  
B104/B102

AUTHORS: Popov, A. I., Sorokin, P. V., Storizhko, V. Ye., and  
Taranov, A. Ya.

TITLE: Elastic scattering of protons by  $Mg^{25}$  and  $Mg^{26}$  nuclei

PERIODICAL: Akademiya nauk SSSR. Izvestiya. Seriya fizicheskaya,  
v. 26, no. 8, 1962, 1074-1079

TEXT:  $Mg^{25}$  and  $Mg^{26}$  nuclei were bombarded by a proton beam from the electrostatic accelerator of the FTI AN USSR. The spectra of the elastically scattered protons were studied with a magnetic analyzer. The reaction products were analyzed with a magnetic spectrometer. The  $Mg$  targets were produced by a magnetic separator. The elastic scattering cross sections of protons through angles of 90, 125, and 141° in the c.m.s. were recorded. In the proton energy range of 1500-3700 kev (where the energies correspond to excitation energies of  $Mg^{25}$  nuclei between 7800 and 9800 kev) 58 anomalies associated with  $Al^{26}$  levels have been detected. The mean distance between these levels arising in elastic scattering is 40 kev. In the range of 1550-3750 kev (corresponding to excitation

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Elastic scattering of protons ...

S/048/62/026/008/019/028  
B104/B102

energies of the compound nucleus  $Al^{27}$  between 9740 and 11,860 kev),  
37 anomalies associated with  $Al^{27}$  levels have been found. The mean  
distance of these levels is 60 kev. The spins and parities of some levels  
were determined in a phase shift analysis of distinct resonances. There  
are 4 figures and 2 tables. *f*

ASSOCIATION: Fiziko-tekhnicheskiy institut Akademii nauk USSR  
(Physicotechnical Institute of the Academy of Sciences  
UkrSSR)

Card 2/2

24.6600

40105  
S/048/62/026/008/021/028  
B104/B102

AUTHORS:

Sorokin, P. V., Popov, A. I., Storizhko, V. Ye., and  
Taranov, A. Ya.

TITLE:

Elastic scattering of protons from  $O^{18}$  nuclei

PERIODICAL:

Akademiya nauk SSSR. Izvestiya. Seriya fizicheskaya,  
v. 26, no. 8, 1962, 1084-1088

TEXT: The differential cross section of 1.7-3.5 Mev protons scattered through angles of 90, 125, and  $141^\circ$  in the c.m.s. was measured. The  $O^{18}$  targets were obtained by a magnetic separator. The table gives the resonances found, the energies of the corresponding  $F^{19}$  levels, their spins and parities, and their widths. Spins and parities were determined from 13 distinct resonances by phase shift analysis. Within the limits of error the results are in good agreement with those found by others (R. R. Carlson et al., Phys. Rev., 122, 607 (1961); A. S. Deyneko et al., Izv. AN SSSR, Ser. fiz., 24, 924 (1960)). There are 3 figures and 1 table.

ASSOCIATION:

Fiziko-tekhnicheskii institut Akademii nauk USSR (Physico-technical Institute of the Academy of Sciences UkrSSR)

Card 1/7

S/C56/62/043/003/002/063  
B125/B102

AUTHORS: Sorokin, P. V., Popov, A. I., Storizhko, V. Ye., Taranov,  
A. Ia.

TITLE: Elastic and inelastic scattering of protons by  $\text{Ne}^{22}$  nuclei

PERIODICAL: Zhurnal eksperimental'noy i teoreticheskoy fiziki, v. 43,  
no. 3(9), 1962, 749-751

TEXT: Cross sections were measured of elastic (proton energies 1.6-3.2 Mev) and inelastic (1.9-3.2 Mev) scattering,  $\text{Ne}^{22}(\text{p}, \text{py})$ , through the angles 90, 125, and  $141^\circ$  in the center-of-mass system and the angular distribution of the 1.27-Mev  $\gamma$ -rays: using an apparatus described by A. K. Val'ter et al. (Izv. AN SSSR, seriya fiz., 23, 839, 1959) and P. V. Sorokin et al. (ZhETF, 40, 1253, 1961). The neon gas target was enriched to 87% with  $\text{Ne}^{22}$ . The results of these measurements were evaluated by the method of least squares under the following conditions: The resonance investigated is related to a single level. Only the least possible orbital moments  $l$  and  $l'$  take part in the reaction. The  $\text{Ne}^{22}$  ground state has spin and parity  $0^+$ , the first excited state  $2^+$ . The

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Elastic and inelastic scattering ...

S/056/62/043/003/002/063  
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$\gamma$ -transition between  $2^+$  and  $0^+$  is a pure E2-transition. In this case, the angular distribution of the inelastically scattered protons can be represented as  $1+a_2\cos^2\theta$ . The relative intensities of  $\gamma$ -transitions determined from the relative intensities of the peaks in the spectrum of the  $\gamma$ -rays range from 0.12 to 2.86 and the measured widths of these transitions from 15 to 33 keV. The reduced widths  $\gamma_p^2$  calculated from the resonance integral are between 2.5 and 225 keV for  $0.1 \leq \Gamma_p/\Gamma \leq 8$  keV. As the proton energy  $E_{lab}$  increases from 1.914 to 3.16 MeV the excitation energy of the  $Na^{23}$  level increases monotonically from 10.626 to 11.818 MeV. There are 1 figure and 1 table.

ASSOCIATION: Fiziko-tekhnicheskiy institut Akademii nauk Ukrainskoy SSR  
(Physicotechnical Institute of the Academy of Sciences  
Ukrainskaya SSR)

SUBMITTED: January 24, 1962

Card 2/2

ANTUF'YEV, Yu.P.; EL'-SHESHENI, M.M.; SOAD, Kh.R.; SALCH, Z.A.; SOROKIN, P.V.

Study of the reaction  $\text{Li}^6(d, \alpha)\text{He}^4$  at deuteron energies ranging  
from 1 to 2.5 Mev. Izv. AN SSSR. Ser. fiz. 27 no.11:1451-  
1455 N '63. (MIRA 16:11)

CHUDOV, Yu. P.; BEDEV, O. Ye.; EL'-NADI, L. M.; DARVISH, D. A. Fe.; SOROKIN, P. V.

"Energy Levels of the Nucleus  $Si^{28}$ ."

report submitted for All-Union Conf on Nuclear Spectroscopy, Tbilisi, 14-22  
Feb 64.

KhFTI (Ukrainian Physico Technical Inst, Khar'kov)

A. A.; ANTUF'YEV, Yu. P.; BARANIK, A. T.; EL'-ZAYKI, M. I.; NUER, T. M.;  
SOROCHIN, V. 5

"Investigations of the Reaction  $Al^{27}(d, \gamma)Mg^{25}$  at Deuteron Energies 1.5 - 2.5 MeV. Dependence of the Intensity of Alpha Groups on the Spin of Levels of the Final Nucleus  $Mg^{25}$ ."

report submitted for All-Union Conf on Nuclear Spectroscopy, Tbilisi, 14-22 Feb 64.

KhFTI (Ukrainian Physico Technical Inst, Khar'kov)



ABUZEYD, M.A.; ALI, F.M.; ANTUF'YEV, Yu.P.; BARANIK, A.T.; NUER, T.M.;  
SOROKIN, P.V.

Studying the reaction  $Al^{27}(p, \alpha)Mg^{24}$  in the proton energy range  
1 - 2.5 Mev. Izv. AN SSSR. Ser. fiz. 28 no.1:46-50 Ja '64.  
(MIRA 17:1)

1. Yegipetskaya atomnaya komissiya, Kair, Ob'yedinennaya Arabskaya  
Respublika.

ANTUF'YEV, Yu.P.; SOROKIN, P.V.

Circuit for dividing the working range of the AI-100-1 analyzer  
into two subgroups of 50 channels each. Prib. i tekhn. eksp. 9  
no.3879-80 My-Je '64 (MIRA 18:1)

ANTUF'YEV, Yu.P.: BEDEVI, O. Ye. [Badawy, O.E.]; EL'-NADI, L.M.;  
DARVISH, D.A. Ye. [Darwish, D.A.E.]; SOROKIN, P.V.

Energy levels of the  $\text{Si}^{28}$  nucleus. Izv. SN SSSR. Ser. fiz.  
28 no.7:1156-1159 JI '64 (MIRA 17:8)

1. Otdeleniye yadernoy fiziki Atomnoy komissii Ob'yedinennoy  
Arabskoy Respubliki, Yegipet, Kair, i Fiziko-tekhnicheskiy  
institut AN UkrSSR.

L 14-77-65 EWT(m) DIAAP/SSD/ESD(g)/ESD(t)  
ACCESSION NR: AP4048643

S/0043/64/028/010/1717/1720

AUTHOR: Abuzeyd, M.A.; Antuf'yev, Yu.P.; Baranik, A.T.; El'-Zayki, M.I.; Nover, T.M.; Sorokin, P.V. 8

TITLE: Investigation of the  $(d, \alpha)$  reaction on  $Al^{27}$  at deuteron energies from 1.5 to 2.6 MeV. Dependence of the  $\alpha$ -group abundances on the spin of the final state of  $Mg^{25}$  <sup>19</sup> Report, Fourteenth Annual Conference on Nuclear Spectroscopy held in Tbilisi 14-22 Feb 1964

SOURCE: AN SSSR. Izv. Seriya fizicheskaya, v.28, no.10, 1964, 1717-1720

TOPIC TAGS: nuclear physics, nuclear spectroscopy, excited state, deuteron reaction,  $\alpha$ -particle, spin, compound nucleus.

ABSTRACT: The energy and angular distributions of  $\alpha$ -particles from the  $Al^{27}(d, \alpha) - Mg^{25}$  reaction were measured at 12 different deuteron energies from 1.506 to 2.54 MeV. The deuterons were accelerated in the electrostatic accelerator of the Egyptian Atomic Commission, an unsupported aluminum target was employed, and the  $\alpha$ -particles were recorded with semiconductor detectors. Eight  $\alpha$ -particle groups were distinguished, corresponding to ten  $Mg^{25}$  levels. The angular distributions of the

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L 14497-65

ACCESSION NR: AP4048645

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various groups were measured at angles greater than  $70^\circ$ . The angular distributions varied greatly with deuteron energy but were generally symmetric about  $90^\circ$ . This indicates that the reaction proceeds by compound nucleus formation with participation of a moderate number of levels. The yields of the different  $\alpha$ -particle groups were found by integrating the angular distributions. The results of integration were corrected for barrier penetration by the ejected  $\alpha$ -particle, divided by  $2I + 1$ , where  $I$  is the spin of the corresponding  $M_{25}$  state; the final values are tabulated. The quotients (normalized to unity for the highest energy group) varied from 0.54 to 1.68. When the quotients for each group were averaged over all the incident deuteron energies, however, the variation was only from 0.89 to 1.22. It is concluded that the intensities of the  $\alpha$ -particle groups from  $(d, \alpha)$  reactions, when adequately averaged over the incident deuteron energy, are proportional to  $2I + 1$ , as indicated by the statistical compound nucleus theory, and can be employed to determine nuclear spins. The present results were compared with those obtained by N. MacDonald (Nucl. Phys. 33, 110, 1962) with 10 MeV deuterons. The mean square deviation from proportionality to  $2I + 1$  was 10% for the present data and 18% for those of MacDonald. "The authors thank El Nadi for cooperation in performing the work, El Nashar and Mustafa Raga for assistance in conducting the experiments, and N. Dobrychenko for help in preparing the paper." Orig. art. has: 4 formulas and 2 figures.

2/3

ACCESSION NR: AP4019200

S/0056/64/046/002/0409/0414

AUTHORS: Antuf'yev, Yu. P.; Bunduk, T.; Fikri, A.; Machali, F.;  
Sorokin, P. V.

TITLE: Investigation of the  $\text{Li}^7(p, \alpha)\text{He}^4$  reaction induced by polarized protons with energy 0.5--2 MeV

SOURCE: Zhurnal eksper. i teor. fiz., v. 46, no. 2, 1964, 409-414

TOPIC TAGS: lithium 7, helium 4, proton Alpha reaction, proton polarization, sensitivity to proton polarization, elastic proton scattering, left right asymmetry

ABSTRACT: The sensitivity of the  $\text{Li}^7(p, \alpha)\text{He}^4$  reaction to proton polarization, defined as the ratio of anisotropic component of the reaction cross section to isotropic component, was measured using polarized protons obtained from the elastic scattering reaction  $\text{C}^{12}(p, p)\text{C}^{12}$  at a  $60^\circ$  angle. The sensitivity  $\chi$  was determined from

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ACCESSION NR: AP4019200

the left-right asymmetry  $R$ , defined as the ratio of the counter readings in positions 7 and 8, respectively (Fig. 1), using the relation

$$R = (1 + P_1 r) / (1 - P_1 r),$$

where  $P_1$  is the polarization of the elastically scattered protons. At low energies and at an angle of  $45^\circ$  the sensitivity does not exceed 10%, but rises smoothly to 60% at 2 MeV with increasing proton energy. The results are in good agreement with those of L. Wolfenstein (Phys. Rev. v. 75, 1664, 1949) at  $225^\circ$  phase shift and of K. Bearpark et al (Nucl. Phys. v. 33, 648, 1962). "The authors are indebted to Prof. El-Nadi for collaboration in the work. We are grateful to A. M. El-Nashar, G. F. Kirshin, to Mustafa Raga for help with the experiments, and to G. Akseneva for help in preparing the article for publication." Orig. art. has: 5 figures, 3 formulas, and 7 tables.

Card 2/32

ANTUF'YEV, Yu.P.; BUNDUK, T.; FIKRI, A.; MACHALI, F.; SOROKIN, P.V.

Study on the reaction  $\text{Li}^7 (p, \alpha) \text{He}^4$  induced by 0.5 - 2 Mev.  
polarized protons. Zhur. eksp. i teor. fiz. 46 no.2:409-414  
F '64. (MIRA 17:9)



L 41402-66 EWP(e)/EWT(m)/T/EWP(t)/ETI IJP(c) JD

ACC NR: AP6019609 (A,N) SOURCE CODE: UR/0048/66/030/002/0220/0223

AUTHOR: Sorokin, P.V.

ORG: - Sorokin, P.V.

TITLE: On the sensitivity of the  $B^{11}$  (p, gamma)  $C^{12m}$  and  $B^{11}$  (p, alpha)  $Be^8$  reactions near the 162 keV resonance to the polarization of the protons /Report, Fifteenth Annual Conference on Nuclear Spectroscopy and Nuclear Structure, held at Minsk, 25 Jan. to 2 Feb. 1965/

SOURCE: AN SSSR. Izvestiya. Seriya fizicheskaya, v. 30, no. 2, 1966, 220-223

TOPIC TAGS: nuclear reaction, nuclear resonance, proton polarization, boron, carbon, beryllium

ABSTRACT: The author has employed theoretical formulas given by A.Symon (Phys.Rev., 92, 1050 (1953)) and nuclear data given by D.S.Craig, W.C.Gross, and R.G.Jaris (Phys. Rev. A, 96, 825 (1954)) and P.I.Grant, F.C.Flack and I.G.Rutherglen (Proc.Phys.Soc. A, 67, 751 (1954)) to calculate the sensitivity of the  $B^{11}$  (p, $\gamma$ ) $C^{12m}$  ( $E_\gamma = 12$  MeV) and  $B^{11}$  (p, $\alpha$ ) $Be^8$  ( $Q = 6.7$  MeV) reactions to the polarization of the incident protons. The sensitivity to proton polarization of the  $B^{11}$  (p, $\gamma$ ) reaction was found to depend on the difference between the phase shifts for different channel spins. There are no experimental data on such phase shift differences; resonance reactions of the type

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ACC NR: AP6019609

under discussion would provide a suitable tool for investigating them. In the  $B^{11}$  ( $p, \alpha$ ) reaction there is considerable interference between the  $2^+$  resonance level and a  $1^-$  level with  $l_p = 0$ , as a result of which the reaction would be sensitive to the incident proton polarization even if the  $B^{11}$  ( $p, \gamma$ ) reaction were not. The calculated sensitivity of the  $B^{11}$  ( $p, \alpha$ ) reaction to proton polarization is presented graphically as a function of proton energy near the 162 keV resonance for a scattering angle of  $45^\circ$  and different values of the phase shift difference. It is estimated that a 0.1 microamp polarized proton beam will be required for experimental investigation of the reactions. Orig.art. has: 7 formulas and 3 figures.

SUB CODE: 20

SUBM DATE: 00

ORIG. REF: 000

OTH REF: 005

Card

2/2

*Relh*

SOROKIN, P. Ya.

Overheating side-blown steel. P. Ya. Sorokin. *Lit. Zh.*  
*Proizvodstvo* 1955, No. 8, 23-5. — In side-blown vessels, C is  
eliminated by the endothermal reaction  $\text{FeO} + \text{C} = \text{CO} + \text{Fe}$ ,  
so that the reaction merely cools the bath previously  
heated by Si and Mn oxidation. Subsequent oxidation of  
CO to  $\text{CO}_2$  cannot heat the bath, since the calcns. based on  
gas analysis of 11 heats (tabulated) show that the heat  
brought in by the reaction can produce an av. gas temp.  
of  $875^\circ$ . Actual temp. measurements are not reported.

J. D. Gat

SOROKIN, P. Ya.

Iron volatilization from cast iron during after-blow of converters. P. Ya. Sorokin. *Izvest. Akad. Nauk S.S.S.R., Otdel. Tekh. Nauk* 1956, No. 8, 28-36. — The temp. of bursting air bubbles, measured with optical pyrometers under lab. conditions, is considerably higher than of the metals through which the air is blown. This local superheating causes satn. with Fe vapors at the local bubble temp. FeO may also be partially vaporized, but the usual explanation of the brown gas coloration at the converter mouth by the Fe vaporization, and not by its mech. entrainment, is not affected by FeO vaporization. During the passage of the gas bubble through the metal at a temp. higher than the metal temp., the Fe vapors are partially condensed, with the formation of fine Fe particles (fog). The fine fog and the uncondensed Fe vapors, on being carried out of the converter, are rapidly oxidized by the air. The progressive C reduction in the metal increases the relative Fe oxidation, raises the total heat balance of the system, and, in particular, the local heat balance in the air bubbles. The larger heat supply increases the Fe vaporization rate and the production of dense brown fumes at the end of the after-blow period. The after-blow of the metal with O, and especially of cast iron, sharply increases the Fe losses.

W. M. Sternberg

SOROKIN, T. Ya.

DUBROV, N.F., kand. tekhn. nauk; MIKHAYLOV, O.A., kand. tekhn. nauk;  
 FEL'DMAN, I.A.; DANILOV, A.M.; SOROKIN, P.Ya., kand. tekhn. nauk,  
 starshiy nauchnyy sotrudnik; BUTAKOV, D.K., kand. tekhn. nauk,  
 dots.; SOYFER, V.M.; LATASH, Yu.V., mladshiy nauchnyy sotrudnik;  
 ZAMOTAYEV, S.P.; BEYTEL'MAN, A. I.; SAPKO, A.I.; PETUKHOV, G.K.,  
 kand. tekhn. nauk; YEDNERAL, F.P., kand. tekhn. nauk, dots.;  
 LAPOTYSHKIN, N.M., kand. tekhn. nauk, starshiy nauchnyy sotrudnik;  
 ROZIN, R.M.; NOVIK, L.M., kand. tekhn. nauk, starshiy nauchnyy  
 sotrudnik; LAVRENT'YEV, B.A.; SHILYAYEV, B.A.; SHUTKIN, N.I.;  
 GNUCHEV, S.A., kand. tekhn. nauk, starshiy nauchnyy sotrudnik;  
 LYUDMAN, K.F., doktor-inzh., prof.; GHUZIN, V.G., kand. tekhn.  
 nauk; BARIN, S.Ya.; POLYAKOV, A.Yu., kand. tekhn. nauk; FEDCHENKO,  
 A.I.; AGEYEV, P.Ya., prof., doktor; SAMARIN, A.M.; BOKSHITSKIY,  
 Ya.M., kand. tekhn. nauk; GARNYK, G.A., kand. tekhn. nauk;  
 MARKARYANTS, A.A., kand. tekhn. nauk; KRAMAROV, A.D., prof.,  
 doktor tekhn. nauk; FEDER, L.I.; DANILOV, P.M.

Discussions. Biul. TSNIICM no.18/19:69-105 '57. (MIRA 11:4)

1. Direktor Ural'skogo instituta chernykh metallov (for Dubrov).
2. Direktor TSentral'nogo instituta informatsii chernoy metallur-  
 gii (for Mikhaylov). 3. Nachal'nik nauchno-issledovatel'skogo  
 otdela osobogo konstruktorskogo byuro tresta "Elektropech'" (for  
 Fel'dman). 4. Nachal'nik martenovskoy laboratorii Zlatoustovskogo  
 metallurgicheskogo zavoda (for Danilov, A.M.). 5. Laboratoriya  
 protsessov stalevareniya Instituta metallurgii Ural'skogo filiala  
 AN SSSR (for Sorokin).

(Continued on next card)

DUBROV, N.F.---(continued) Carl 2.

6. Ural'skiy politekhnicheskiy institut (for Butakov). 7. Starshiy inzhener Bryanskogo mashinostroitel'nogo zavoda (for Soyfer). 8. Institut elektrosvarki im. Patona AN URSS (for Iatash). 9. Nachal'nik TSentral'noy zavodskoy laboratorii "Uralmashzavoda" (for Zamotayev). 10. Dnepropetrovskiy metallurgicheskiy institut (for Sapko). 11. Moskovskiy institut stali (for Yedneral). 12. TSentral'noy nauchno-issledovatel'skiy institut chernoy metallurgii (for Gnuchev, Lepotyshkin). 13. Starshiy master Leningradskogo zavoda im. Kirova (for Rozin). 14. Institut metallurgii im. Baykova AN SSSR (for Novik, Polyakov, Garmyk). 15. Nachal'nik tekhnicheskogo otdela zavoda "Bol'shevik" (for Lavrent'yev). 16. Starshiy inzhener tekhnicheskogo otdela Glavspetsstali Ministerstva chernoy metallurgii (for Shilyayev). 17. Zamestitel' nachal'nika tekhnicheskogo otdela zavoda "Elektrostal'" (for Shutkin). 18. Freybergskaya gornaya akademiya, Germanskaya Demokraticheskaya Respublika (for Lyudeman). 19. Zaveduyushchiy laboratoriyey stal'nogo lit'va TSentral'nogo nauchno-issledovatel'skogo instituta tekhnologii i mashinostroyeniya (for Gruzin). 20. Starshiy master elektrostaleplavil'nykh pechey Uralvagonzavoda (for Barin). 21. Zamestitel' nachal'nika elektrostaleplavil'nogo tsekha zavoda "Sibelektrostal'" (for Fedchenko). 22. Zaveduyushchiy kafedroy metallurgii stali i elektrometallurgii chernykh metallov Leningradskogo politekhnicheskogo instituta (for Ageyev). 23. Zamestitel' direktora Instituta metallurgii im. Baykova AN SSSR, chlen-korrespondent AN SSSR (for Samarin).

(Continued on next card)

DUBROV, N.F.---(continued) Card 3.

24. Nachal'nik laboratorii Tsentral'nogo nauchno-issledovatel'skogo instituta chernoy metallurgii (for Bokshitskiy). 25. Zaveduyushchiy kafedroy elektrometallurgii Sibirskogo metallurgicheskogo instituta (for Kramarov). 26. Nachal'nik elektrostaleplavil'nogo tsekha Kuznetskogo metallurgicheskogo kombinata (for Tedor). 27. Nachal'nik elektrometallurgicheskoy laboratorii Kuznetskogo metallurgicheskogo kombinata (for Danilov, P.M.).

(Steel--Metallurgy)

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SOROKIN, P. Ya.

"Production of Low-Carbon Ferro-Chrome by Blowing and Vacuum Treatment,"  
paper presented at Second Symposium on the Application of Vacuum Metallurgy.

*1-6 Jul. 1958, Moscow*



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SOV/137-59-5-9971

18.7110

Translation from: Referativnyy zhurnal, Metallurgiya, 1959, Nr 5, p 76 (USSR)

AUTHORS: Sorokin, P.Ya., Petrov, K.M., Kokin, A.I.

TITLE: The Problem of Vacuum-Degassing of Steel for Electrical Engineering Purposes

PERIODICAL: Tr. In-ta metallurgii. Ural'skiy fil. AS USSR, 1958, Nr 2,  
pp 67 - 72

ABSTRACT: The Institute of Metallurgy UFAN USSR together with the Verkh-Issetskiy Plant investigated the effect of vacuum treatment on the quality of transformer steel smelted in a basic electric furnace. Vacuum treatment was carried out under laboratory conditions in a chamber containing a ladle of ~ 40 kg capacity filled with metal. The metal was kept in the chamber for 8 - 10 minutes with a vacuum of 97 - 98%. Experiments were carried out with vacuum treatment of liquid steel in a 500-kg mold during the siphon-filling process. The experimental mold was equipped with a flange in its upper section to fasten the cover. The mold

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SOV/137-59-5-9971

## The Problem of Vacuum-Degassing of Steel for Electrical Engineering Purposes

was filled within 2 - 2.5 minutes under violent effervescence of the metal. The vacuum was on the average 425 mm Hg. Under industrial conditions, vacuum treatment was performed in a chamber holding a 20-ton ladle with liquid metal. During rarefaction of 650 - 700 mm Hg a violent gas liberation occurred during 3 - 4 minutes, accompanied by a boiling of the metal and ascent of the slag. Ten minutes after vacuum treatment, bubbling continued only there where the slag contacted the lining of the ladle. Gases pumped out of the chamber contained  $\text{CO}_2$ , CO,  $\text{H}_2$  and  $\text{H}_2\text{S}$ . Heavy corrosion of the refractory lining of the ladle and the stopper coils was observed 8 - 10 minutes after the vacuum treatment began. This limited considerably the duration of the vacuum treatment. Metal subjected to vacuum treatment in a laboratory chamber, or during filling of the mold, showed a reduction of [H] and improved bending characteristics. It was noted that vacuum treatment of large metal masses did not considerably improve the quality of the metal. It is pointed out that this is caused by the secondary saturation of the metal with [H] during its contact with the refractories within the siphon. It was established that vacuum treatment of metal in a ladle promoted the refinement of the grain structure in cast

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SOV/137-59-5-9971

The Problem of Vacuum-Degassing of Steel for Electrical Engineering Purposes

steel. Conventional ingots had uniform transcrystallization, while vacuum-cast ingots had a uni-axial crystalline structure. As a result of vacuum treatment [H] was reduced by 25 - 40%, and the amount of non-metallic impurities by 25 - 30%.

V.P.

Card 3/3

SOV/137-58-11-22143

Translation from: Referativnyy zhurnal. Metallurgiya, 1958, Nr 11, p 45 (USSR)

AUTHORS: Sorokin, P. Ya., Zabaykin, A. V., Babich, P. P., Zakharov, O. A.

TITLE: Continuous Measurement of the Temperature of Liquid Steel in the Ladle (Nepreryvnyy zamer temperatury zhidkoy stali v kovshe)

PERIODICAL: Prom-ekon. byul. Sov. nar. kh-va Sverdl. ekon. adm. r-na, 1958, Nr 4, pp 3-6

ABSTRACT: The measurements are made in ladles of 30-45 t capacity by Pt/Ph-Pt thermocouple introduced into the ladle either by a dummy stopper from above or through the nozzle of the spare pouring aperture in the bottom of the ladle. The thermocouple junction is protected by covers made on a Zr-oxide base and are installed at 200-300 mm from the ladle bottom. The experiments conducted showed the temperature of the metal (Me) in the ladle, when under an adequate layer of slag, drops not at a gradient of 2-3°C/min, as had previously been held, but considerably more slowly. The method of continuous measurement of the temperature of the liquid steel makes it possible to determine the length of time during which the Me should be held in the ladle after the heat has been tapped, and this facilitates purification from nonmetallic

Card 1/2

SOV/137-58-11-22143

Continuous Measurement of the Temperature of Liquid Steel in the Ladle

and gas inclusions.

V. G.

Card 2/2

AUTHOR: Sorokin, P.Ya., Candidate of Technical Sciences SOV/133-58-11-7/25

TITLE: Balance of Experimental Converter Smelting with Oxygen Blast (Balans opytnoy konverternoy plavki na kislородnom dut'ye)

PERIODICAL: Stal', 1958,<sup>q</sup> Nr 11, pp 987 - 992 (USSR)

ABSTRACT: As the determination of the amount of oxidised metal during oxygen blowing under industrial conditions is inaccurate, experimental heats in a 50 kg laboratory converter, lined with chamotte bricks (walls 115 mm and bottom 240 mm thick) were carried out. The tuyere possessed two nozzles 6 mm in diameter and was made from a piece of fused magnesite. The laboratory set-up is shown in Figure 1 and all experimental materials charged and produced with the exception of fumes were weighed. The composition of starting and produced materials and fumes is given in Tables 1 and 2, respectively; the material balance - Table 3. It was established that under experimental conditions, the majority of slag-forming elements are volatile; therefore, the weights of slag were checked on the basis of alumina content. As by direct experiments it is difficult to establish the actual state of the elements eliminated during blowing, three

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SOV/133-58-11-7/25

Balance of Experimental Converter Smelting with Oxygen Blast

modifications of heat balance were made in which the elements eliminated were assumed to be in the form of oxides, liquid and vapour state (Tables 4 and 5). The best heat balance was obtained when assuming that the eliminated elements were in the form of vapour. The results obtained indicated that the elimination (burning out) of slag-forming elements during blowing with oxygen amounted to: iron 9.5%, silicon 15.3%, chromium 16.01% and manganese 18.6%. Altogether about 24% of the total heat evolved is used for the evaporation of slag-forming elements. In respect of the utilisation of heat, the most economical would be supplying oxygen to the bottom of the converter through the tuyeres with a minimum possible cross-section of nozzles. A large surplus of heat characteristic for the converter process with an oxygen blast should be utilised for melting scrap and

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SOV/133-58-11-7/25

Balance of Experimental Converter Smelting with Oxygen Blast

reduction of iron ore. The dilution of oxygen with leaning gases or steam in order to reduce localised high temperatures in the reaction zone from the point of view of heat utilisation is not advantageous.

There are 2 figures, 5 tables and 9 references, 7 of which are Soviet, 1 English and 1 German.

ASSOCIATION: Institut metallurgii UFAN SSSR (Institute of Metallurgy of the Urals Branch, AS USSR)

Card 3/3



AUTHORS: Sorokin, P.Ya., Mikhaylikov, S.V. 32-3-21/52

TITLE: Continuous Measuring of Metal Temperatures in Laboratory Induction Furnaces (Neprevnyy zamer temperatur metalla v laboratornykh induktsionnykh pechakh)

PERIODICAL: Zavodskaya Laboratoriya, 1958, Vol. 24, Nr 3, pp. 311-312 (USSR)

ABSTRACT: An induction furnace with a holding capacity of 7 kg metal melt and with a thermocouple element (consisting of a tungsten-molybdenum-couple) is described. The thermocouple element is provided with a protective top made of a material based upon zirconium oxide, which protrudes through the bottom of the furnace, which is made of magnesite, into the melt. A schematical drawing of the furnace as well as several graphs showing temperature modifications during continuous measurement are given. Temperature measurements carried out at 1600° C with a platinum-platinum-rhodium couple agreed with measurements carried out simultaneously with the tungsten-molybdenum couple. The zirconium-oxide top did not change in the course of measurements, so that a mechanical destruction need not be feared except as a result of carelessness. There are 2

Card 1/2

Continuous Measuring of Metal Temperatures in Laboratory  
Induction Furnaces

32-3-21/52

figures.

ASSOCIATION: Institute for Metallurgy of the Ural Branch AS USSR (Institut  
metallurgii Ural'skogo filiala Akademii nauk SSSR)

AVAILABLE: Library of Congress

1. Induction heating
2. Metals-Temperature factors
3. Thermocouples-Applications

Card 2/2

8(4)

SOV/32-24-12-21/45

AUTHORS:

Sorokin, P. Ya., Zabaykin, A. V., Babich, F. P., Zakharov, O.A.

TITLE:

Continuous Measurement of the Temperature of Molten Steel in the Ladle (Nepreryvnyy zamer temperatury zhidkoy stali v kovshe)

PERIODICAL:

Zavodskaya Laboratoriya, 1958, Vol 24, Nr 12, pp 1475-1477 (USSR)

ABSTRACT:

Immersion thermoelements give better results than optical apparatus in the measurement of the temperature of molten metals. From 1952 to 1954 continuous temperature measurements were carried out in liquid steel still in ladles holding 30-45 tons by the institute mentioned in the Association in collaboration with Ural'skiy vagonostroitel'nyy zavod (Ural Car-Building Plant) and Zavod transportnogo mashinostroyeniya v Chelyabinske (Transport Machine-Building Plant in Chelyabinsk). The thickness of the lining of the ladles used was 200 mm (walls) and 350 mm (floor). In one case the thermoelement was mounted as a pseudo seal (Fig 1), while in another case it was introduced through the outlet (Fig 2). The experimental results obtained (Figs 3-5) indicate the following: the

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Continuous Measurement of the Temperature of Molten Steel in the Ladle

temperature of the liquid metal becomes stable at a particular level after 15 minutes (curve of the figure). During the casting process the temperature of the liquid metal increases slowly in the case where a slag layer of 200-250 mm thick is present, or remains constant in the case where the slag layer is thinner. Contrary to wide-spread opinion, the temperature of the metal increases at the end of the casting process, and this finding agrees with the work of Van Gryunvigen and Lauter (Ref 2), Pronov (Ref 3), Gruzin (Ref 4), and Boos and Vil'yams (Ref 5). The temperatures determined using optical pyrometers are always lower than those obtained using thermoelements. The temperatures in the upper metal layers are greater than in the lower layers (Figs 3,4). There are 5 figures and 5 Soviet references.

ASSOCIATION: Institut metallurgii Ural'skogo filiala Akademii nauk SSSR  
(Institute of Metallurgy of the Ural Branch, Academy of  
Sciences, USSR)

Card 2/2

~~15(2)~~ 15.2210

66580

AUTHOR: Sorokin, P. Ya.

SOV/131-59-11-7/13

TITLE: Zirconium Tips of Thermocouples for the Measurement of Temperature of Liquid Steel

PERIODICAL: Ogneupory, 1959, Nr 11, pp 517-522 (USSR)

ABSTRACT: The Institut metallurgii Ural'skogo filiala AN SSSR (Metallurgical Institute of the Ural Branch of the Academy of Sciences, USSR) worked out a method of producing such zirconium tips. These are produced from a mass on the basis of technical zirconium dioxide with a content of 96.06%  $ZrO_2$ , 0.96%  $SiO_2$ , 0.26%  $TiO_2$ . Fireproof clay was used as binding agent, and chemically pure silicon oxide was employed to stabilize the zirconium dioxide. As of late, calcium oxide is recommended for use as stabilizing agent, as may be observed from reference 4. The production of tip blanks is described in detail. The blanks are burnt during 2 hours at a temperature of 1700-1750°, and subsequently cooled to 100-150° together with the furnace. Shrinkage with burning amounts to 25-30%. The tips are pressed from a carefully prepared mass, as shown in figure 1 and subsequently described. The tips are

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Zirconium Tips of Thermocouples for the Measurement  
of Temperature of Liquid Steel

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tested under laboratory and operational conditions, and are dipped into liquid steel without prior heating to attain a temperature of 1600-1650°. After cooling to 15-20° they are once again introduced into a furnace with a temperature of 1500° without undergoing destruction (see figures 2 and 3). For a comparison, figure 4 shows alundum tips which were dipped into liquid steel after prior heating, and which burst immediately in the process. Figure 5 shows three tiles with inserted tips which were left for about two hours in liquid steel at a temperature of up to 1780°. In an acid Martin furnace of the metallurgicheskiy zavod im. Serova (Metallurgical Works imeni Serov) experiments were made with an uninterrupted temperature measurement of liquid steel, and good results were obtained. The following persons took part in these experiments: V. F. Isupov, P.P. Semenenko, I.G. Fadeyev, A.A. Chepurnova, Yu.F. Prosyantov, G.A. Bolotov, V.G. Tyumbayev, A.S. Gorbunov, I.Ye. Mosyagin. Experiments to determine the electric insulation properties of the zirconium dioxide tips were made by S.V. Shtengel'meyyer. The table supplies data concerning the change of the electromotive force of thermo-

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Zirconium Tips of Thermocouples for the Measurement  
of Temperature of Liquid Steel

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electrodes depending on the heating rate of zirconium tips. Figure 6 shows the temperature course of the metal of two melts in the furnace, that were measured by means of an uninterruptedly acting thermocouple. Figures 7, 8, and 9 show the thermocouple and the tips after a stay of about 55-70 min in liquid steel. The author states in conclusion that the first laboratory experiments with tips on the basis of zirconium dioxide yielded good results. It is suggested that a large experimental stock of such tips be produced according to the method of the Institut metallurgii Ural'skogo filiala AN SSSR (Metallurgical Institute of the Ural Branch of the Academy of Sciences, USSR), and that they be tested in a number of metallurgical works. There are 9 figures, 1 table, and 5 Soviet references.

ASSOCIATION: Institut metallurgii Ural'skogo filiala AN SSSR (Metallurgical Institute of the Ural Branch of the Academy of Sciences, USSR)

Card 3/3

SOROKIN, VYA

PHASE I BOOK EXPLOITATION

SOV/4613

Akademiya nauk SSSR. Ural'skiy filial. Institut metallurgii

Voprosy kontrolya i kompleksnogo ispol'zovaniya syr'ya v metallurgii  
(Problems of Control and Complete Utilization of Raw Materials in Metal-  
lurgy) Sverdlovsk, 1960. 194 p. (Series: Its: Trudy, vyp. 5) Errata  
slip inserted. 1,000 copies printed.

Resp. Eds.: M. I. Kochnev, and V. P. Chernobrovkin, Candidates of Technical  
Sciences. Ed. of Publishing House: I. M. Demin; Tech. Eds.: L. A. Izmodenova,  
and N. F. Seredkina.

PURPOSE: This collection of articles is intended for technical personnel of  
metallurgical plants and for members of scientific research institutes.

COVERAGE: The collection contains articles discussing a variety of problems  
pertaining to ferrous and nonferrous metallurgy. A number of articles  
describe new methods for investigating the properties of alloys and oxides  
and review changes which these properties undergo as a result of the effect  
of temperature and other factors. Findings of studies are summarized

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Problems of Control and Complete (Cont.)

SOV/4613

in numerous articles and processes to be used for manufacturing ferroalloys and naturally-alloyed steels are suggested. Characteristics of various metal compounds are given and measures for the most efficient utilization of ores are indicated. Some of the articles are devoted to the study of problems of manufacturing ferrous, nonferrous, and rare metals. The selection of topics was made on the basis of the need for material relating to the improvement of the quality control of alloys and the manufacturing processes employed to produce them. No personalities are mentioned. Each article is accompanied by references, most of which are Soviet.

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PART I BOOK RECAPITULATION 307/1518

Academiya nauk SSSR. Komissiya po fiziko-khimiicheskoi osnovnoy proizvodstva stali  
Primeneniye vakuumu v metallurgii (Use of Vacuum in Metallurgy) Moscow, Izdat-vo  
AN SSSR, 1940. 314 p. Kratka aliip inserted. 4,500 copies printed.

Sponsoring Agency: Akademiya nauk SSSR. Institut metallurgii i stali A.A. Baykova.

Komissiya po fiziko-khimiicheskoi osnovnoy proizvodstva stali.

Resp. Ed.: A.M. Smarin, Corresponding Member, Academy of Sciences USSR; Ed. of  
Publishing House: G.M. Makovskiy; Tech. Ed.: S.O. Martovitch.

PURPOSE: This collection of articles is intended for technical personnel interest-  
ed in recent studies and developments of vacuum steelmaking practices and equip-  
ment.

CONTENTS: The book contains information on steel making in vacuum induction fur-  
naces, and vacuum arc furnaces, reduction processes in vacuum, and degassing of  
steel and alloys. The functioning of apparatus and equipment, especially  
vacuum furnaces and vacuum booster pumps is also analyzed. Personalities are  
mentioned in connection with some of the articles and will appear in the Table  
of Contents. Three articles have been translated from English. Some of the  
of Contents: K.A. V.K. Jaconenko and I.B. Bolgova. Melting and Pouring of  
Nickel-Base Alloys in Vacuum [V.A. Zaslavskiy, S.P. Lashko, V.I. Anshaba,  
A.P. Balashov and V.V. Hublin participated in the work]

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Rebinder, Yu.A.; L.V. Bialoy, S.I. Parov, and Yu.A. Yilin. On Effect of  
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the Properties of Ball-Bearing Steel Remelted in a Vacuum Arc Furnace

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Skorbin, P. Ya. Production of Low-Carbon Ferrochrome by Blowing Under  
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Meyerson, G.A. Vacuum-Thermal Reduction of Oxides of the Refractory Metals  
by Carbon [O.I. Kreyn, G.V. Samonova, I.A. Lipkes, G.I. Ievreva and  
others of the Department of Metallurgy of Rare Metals of the Moskovskiy  
Institut tsvetnykh metallov i spetsialnykh spetsialnykh instituta of Nonferrous Metals  
and Gold] conducted investigations on which this article is based]

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Reb, G. [Polish People's Republic, Institute of Iron Metallurgy in  
Gliwice] Decarburization of Ferrochrome in Vacuum

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SOPOKIN, P.YA.

SOROKIN, P.Ya.

Preparation of low-carbon ferrochromium by blowing in vacuum.  
Trudy Inst.met.UFAN SSSR no.5:11-20 '60. (MIRA 13:8)  
(Iron-chromium alloys)  
(Vacuum metallurgy)

S/133/60/000/011/006/023  
A054/A029

AUTHOR: Sorokin, P.Ya., Candidate of Technical Sciences

TITLE: On the Vacuum Treatment of Bessemer Steel

PERIODICAL: Stal', 1960, No. 11, pp.988-991

TEXT: The author discusses an article of A.M. Samarin, L.M. Novik, G. E. Tsukanov, M.P. Kuznetsov and A.I. Lukutin, published in Stal', No. 3, 1959 on the vacuum treatment of molten steel in the ladle, asserting that degasification takes place uniformly throughout the metal. This assertion is not proved as the article in question contains only one diagram showing the changes in the hydrogen content of metal samples taken from the upper layers of the metal and at the 320,680, 1,080 and 1,380 mm levels from the metal surface in a 22 ton ladle from 18 test castings with vacuum treatment out of 38. The authors did not publish any analyses of samples taken from such layers, in which the ferrostatic pressure exceeded the value of vacuum. Their theory cannot be accepted as correct since, moreover, only 3 samples were taken from the border layer in which the vacuum was still active, (1,380 mm), while in all of the samples taken from lower layers a rising H-quantity could be observed. In the Institut metallurgii UFAN (UFAN Metallurgical Institute) and in Card 1/3 ✓

On the Vacuum Treatment of Bessemer Steel

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A054/A029

the Metallurgicheskiy kombinat im. A.K. Serova (Metallurgical Combine im. A. K. Serov) with the cooperation of S.V. Nagornyy, V.F. Usipov, E.A. Pastukhov, I.G. Fadeyev, P.P. Semenenko and others, the vacuum treatment of molten steel was tested in 4-ton ingot molds for 15 minutes and it was found that the effect of vacuum treatment (producing a concentric, bright zone in the templates) decreased as the depth increased whilst it ceased completely at about 1,400 mm from the top level of the molten metal, which corresponded to the calculated depth, at which the vacuum effect was expected to cease (at a vacuum of 650 mm Hg). Similar results were obtained for products rolled from various layers of vacuum-treated castings. Moreover, the better mechanical properties of rail-steels which must be put down to the alloying with aluminum were attributed erroneously to vacuum treatment, whereas this actually should be attributed to the disintegration of the metal cores. The author of the present article also found that the rack-type cooling apparatus constructed of water cooling pipes, as applied in the Dzherzhinskiy and Zaporozhstal' Plants, was not suitable for application in combination with the vacuum equipment as it produced an unnecessary resistance against the effusing gases thus decreasing the optimum vacuum possible. Vacuum treatment is most effective when accompanied by a coercitive circulation of the metal, produced by blowing inert gases through

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On the Vacuum Treatment of Bessemer Steel

S/133/60/000/011/006/023  
A054/A029

the molten metal during vacuum treatment. There are 2 figures and 7 references: 1 English, 1 German and 5 Soviet.

ASSOCIATION: Institut metallurgii UFAN (UFAN Metallurgical Institute)

✓  
—

Card 3/3

SOROKIN, P.Ye.

Use of MShShI-400 machines. Svar. proizv. no.8:16-18 Ag '65.  
(MIRA 18:8)

1. Leningradskiy zavod "Elektrik".

27126

S/080/60/033/008/019/022/XX  
D213/D305

53400

AUTHORS: Balandin, A.A., Freydlin, L.Kh., Rozina, V.S.,  
Sorokin, P.Z., and Voroshilov, G.A.

TITLE: Method of preparing 2-isopropylanthraquinone

PERIODICAL: Zhurnal prikladnoy khimii, v. 33, no. 8, 1960,  
1893 - 1896

TEXT: Recently alkylanthraquinones have been applied as hydrogen carriers in producing hydrogen peroxide. It has, therefore, been necessary to look for new methods of preparing these compounds on an industrial scale. The specific reaction with which the authors were concerned was to prepare 2-isopropylanthraquinone in two stages, instead of four as in Scholl's method, which involved reacting isopropylbenzene with phthalic anhydride and reducing the resulting 4-isopropylbenzoyl-2-benzoic acid to 4-isopropanyl-benzyl-2-benzoic acid followed by cyclization of the latter in the presence of sulphuric acid. To avoid the formation of sulphonic acid

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D213/D305

Method of preparing ...

derivatives and to increase the yields of the required quinone the authors investigated the influence of the oleum concentration, temperature and period of heating. In the case of 3 % oleum and heating for 1 - 3 hours sulphonation occurred. When the concentration was increased to 8 % the yield of quinone was 15 %; however, this yield decreased when 12 - 20 % oleum was used. The effect of heating with 8 % oleum is shown, and it is clear that the time of reaction determines the yield of quinone. Best results were obtained with reaction times of 2.5 - 3 hours, and under optimum conditions the yield reached 55 - 60 %. In the earlier investigations the first stage, condensation of phthalic anhydride with isopropylbenzene, was conducted in a carbon disulphide medium. The authors, however, used chlorobenzene as a less hazardous solvent and achieved 88 % yields of 4-isopropylbensoyl-2-benzoic acid. The quinone obtained in the present work had a melting point of 56.5 - 57.0°C, (recrystallized from alcohol) as compared with 45°C given in the literature. The composition and properties of the resulting product corresponded to those of isopropylanthraquinone. The quinone

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Method of preparing ...

S/080/60/033/008/019/022/XX  
D213/D305

obtained in both the laboratory apparatus and the model plant had a melting point of 56°C and its C and H contents corresponded with the formula  $C_{17}H_{14}O_2$ . The use of isopropylanthraquinone as a hydrogen transferring agent was studied by hydrogenating the compound in the presence of a skeletal nickel catalyst until a thick mass of 2-isopropylanthrahydroquinone was formed. After separation of the catalyst the product was oxidized with air and the hydrogen peroxide formed was removed with water. A similar reaction has been found to proceed with 2-ethylanthraquinone. In both cases the melting point of the material recovered corresponded to that of the original quinone. There are 1 figure, 1 table and 2 non-Soviet-bloc reference. The reference to the English-language publication reads as follows: A.T. Peters, F.M. Rowe, J. Chem. Soc., 181, 1945. X

SUBMITTED: February 25, 1960

Card 3/3

L 60044-65 EWT(m)/EPF(c)/EWP(j) PC-4/Pr-4 RM

ACCESSION NR: AP5018037

UR/0191/65/000/007/0027/0029  
678.86

22  
B

AUTHOR: Svitsyn, R. A.; Zhigach, A. F.; Sorokin, P. Z.; Zinov'yeva, A. P.

TITLE: Study of the polycondensation of bis(hydroxymethyl)carborane-(2,10) with succinic acid

SOURCE: Plasticheskiye massy, no. 7, 1965, 27-29

TOPIC TAGS: polycondensation, organoboron compound, succinic acid, carborane

ABSTRACT: The basic kinetic relationships governing the equilibrium polycondensation of bis(hydroxymethyl)carborane-(2,10)



with succinic acid were investigated. It was found that the highest molecular weight of the polyester-carborane produced by the polycondensation was obtained when the reagents were taken in stoichiometric properties. A rise in the reaction temperature increased the reaction rate and also raised the molecular weight. The reaction rate constants,

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ACCESSION NR: AP5018037

extent of the reaction P, and polycondensation coefficient  $K_p$  were calculated. The activation energy  $\Delta E$  was found to be  $25250 \pm 2450$  cal/mole. In order of decreasing nucleophilicity, bis(hydroxymethyl)carborane and some hydroxyl-containing compounds can be arranged as follows:



The rate of the reaction of bis(hydroxymethyl)carborane with dicarboxylic acids is considerably less than that with aliphatic glycols. Orig. art. has: 4 figures, 4 tables, and 6 formulas.

ASSOCIATION: None

SUBMITTED: 00

ENCL: 00

SUB CODE: OC

NO REF SOV: 005

OTHER: 006

Card 2/2

SVTTSYN, R.A.; ZHIGACH, A.P.; SARISHVILI, I.G.; ASKADSKIY, A.A.; SCROKIN, P.Z.

Studying the properties of polyester carboranes. Plast. massy  
no.8:18-20 '65. (MIRA 18:9)

POTAPOVA, T.V.; SVITSYN, R.A.; ZHIGACH, A.F.; LAPTEV, V.T.; PERSIANOVA,  
I.V.; SOROKIN, P.Z.

Effect of a carborane ring on the properties of some C-derivatives  
of the carborane (2, 10) series. Zhur. neorg. khim. 10 no.9:2080-  
2083 S '65. (MIRA 18:10)

ACC NR: AP6032504

(A,N)

SOURCE CODE: UR/0413/66/000/017/0070/0070

INVENTOR: Zhigach, A. F.; Sobolevskiy, M. V.; Sorokin, P. Z.; Sarishvili, I. G.; Shpak, V. S.; Vilesova, M. S.

ORG: none

TITLE: Preparative method for boron-containing polymers. Class 39, No. 185487

SOURCE: Izobreteniya, promyshlennyye obraztsy, tovarnyye znaki, no. 17, 1966, 70

TOPIC TAGS: ~~boron-containing polymer~~, liquid polymer, ~~low-molecular-weight polymer~~, chemical synthesis, glycol, polyester resin, decaborane, dicarboxylic acid

ABSTRACT: An Author Certificate has been issued for a method for preparing boron-containing liquid polymers with a molecular weight of 1500—3000 based on polyester-decaborilene [sic]. The method involves preparation of two individual low-molecular-weight esters by reacting at 180C: 1) di(hydroxymethyl)decaborilene [sic] with a dicarboxylic acid [unspecified]; and 2) the dicarboxylic acid with a glycol [unspecified]. The two esters are mixed, heated to about 200C, and held at this temperature in a inert gas for about 50 hr.

SUB CODE: 21, 07/ SUBM DATE: 21Jul62/

Card 1/1

UDC: 678.86.27

TETUSHKIN, A., shturman-aeros"yemshchik; SOROKIN, S., shturman-aeros"yemshchik;  
ZHEBKOV, V., shturman-aeros"yemshchik; CHUGUNKIN, M., shturman-  
aeros"yemshchik.

Improving the training of aerial navigators-photographers. Grazhd.  
av. 12 no.7:16 J1 '55. (MIRA 11:6)  
(Navigation (Aeronautics)) (Photography, Aerial)



RVACHEV, V.P.; SOROKIN, S.A.

Changing synchronous motors over to simplified starting and protection  
circuits. Energ.biul. no.12:1-7 D '57. (MIRA 10:12)  
(Electric motors, Synchronous)

KUZ'MENKO, A.P.; STROYKOVSKIY, A.K.; SOROKIN, S.A.

General solution of Maxwell's equations and its analysis  
for a boundary surface without axial symmetry. Nauch.

trudy KNIUI no.15:399-413 '64.

(MIRA 18:3)

GURFINKEL', M.A.; SOROKIN, S.F.; ULIKOVSKIY, L.G. Prinimal uchastiye  
KUZNETSOV, S.V. D'YACHKOV, V.K., kand.tekhn.nauk, retsenzent;  
NIKOLAYEVSKIY, G.M., kand.tekhn.nauk, retsenzent; ZENKOV, R.L.,  
doktor tekhn.nauk, red.; SAVEL'YEV, Ye.Ya., red.izd-va;  
SOKOLOVA, G.F., tekhn.red.; UVAROVA, A.F., tekhn.red.

[Conveying and loading and unloading machinery used in the chemical  
industries] Transportnye i pogruzochno-razgruzochnye mashiny  
v khimicheskoi promyshlennosti. Moskva, Gos.nauchno-tekhn.izd-vo  
mashinostroit.lit-ry, 1960. 495 p. (MIRA 13:12)

(Conveying machinery) (Loading and unloading)  
(Chemical industries--Equipment and supplies)

S/263/62/000/012/003/005  
1007/1207

AUTHOR: Sorokin, S. I., Shrayber, L. S. and Zabelin, V. A.

TITLE: Device for automatic recording of volume changes

PERIODICAL: Referativnyy zhurnal, otdel'nyy vypusk. 32. Izmeritel'naya tekhnika, no. 12, 1962, 41, abstract 32.12.396 "Nauchn. ezhegodnik. Saratovsk un-t. Fiz. fak. i N.-i. in-t mekhan. i fiz., 1955" Saratov, 1960, 41-47

TEXT: A device is described for automatic recording of volume changes in the gas evolving in a closed system in which chemical reactions occur at constant pressure. The device works on the principle of automatic reduction of pressure within the system to the pressure of the surrounding medium (i.e. to atmospheric pressure). The sensing element of the device consists of a V-shaped differential pressure gage (manometer) whose legs are provided with vertically located moving (threaded) needle contacts. These contacts ensure increased sensitivity of the device: the absolute error in the measurement of volume changes does not exceed  $\pm 0.1\%$  of the volume of the burette used in the device. Narrow tubes may be used as gas burettes, permitting the measurement of small volumes (3-5 cm<sup>3</sup>) with the above accuracy. The device described was used the authors for determining the quantity of gas evolved during thermal analysis of carbonate rocks.

[Abstracter's note: Complete translation.]

Card 1/1

SOROKIN, S. I.

Evaluation of the structure of Volga diatomites by the sorption of water and benzene vapors. P. A. Silasenko, E. M. Timofeeva, S. I. Sorokin, and V. A. Zabella (State Pedagog. Inst., Saratov). *Zhur. Priklad. Khim.* 40, 1127-36 (1967).—The sorption-desorption of  $H_2O$  and  $C_6H_6$  vapors by diatomaceous earths of the Volga region was detd. by the change in wt. of powd. and grain specimens suspended from a quartz spiral. The curves at  $20^\circ$  are S-shaped, exhibiting irreversible hysteresis with  $H_2O$  vapor and reversible hysteresis with  $C_6H_6$ . The specific surface of the skeleton calcd. on the assumption of a unimol. layer at the point of beginning of hysteresis agreed with that calcd. by the method of Kisselov (cf. Avgul, et al., *C.A.* 47, 3079d) and that of Bykov (*C.A.* 47, 940h). Exptl. data obtained with grains were more suitable for the study of structures than those obtained with powders. *See Also*

8  
1-4E4j  
1-4E6d  
1-4E2c(y)  
2-MAY

11  
m2

ADAMSKIY, N.M.; KARPACHEVA, S.M.; SOROKIN, S.I.

Distribution of carboxylic acids between water and kerosine.  
Radiokhimiia 3 no.3:284-290 '61. (MIRA 14:7)  
(Acids, Fatty)  
(Extraction(Chemistry))

SOROKIN, S.I.; ZABELIN, V.A.

Natural sorbents as desiccants of gases. Khim.prom. no.8:538-539  
Ag '61. (MIRA 14:8)

1. Nauchno-issledovatel'skiy institut mekhaniki i fiziki pri  
Saratovskom gosudarstvennom universitete.  
(Gases--Drying) (Sorbents)

KUDRIN, V.A.; OYKS, G.N.; SOROKIN, S.P.; NECHKIN, Yu.M.; GLUSHTSOV, M.V.;  
NAM, B.P.; LAPSHOVA, M.P.; YUDSON, A.A.; PETRENKO, O.D.;  
ADRIANOVA, V.P.

Smelting high-grade steel in open-hearth furnaces fired with  
natural gas. Stal' 20 no. 7:599-602 J1 '60. (MIRA 14:5)  
(Open-hearth furnaces--Equipment and supplies)



S/139/61/000/012/002/006  
A006/A101

AUTHORS: Yakushev, A. M., Kryakovskiy, Yu. V., Tyurin, Ya. I., Sorokin, S. P.,  
Yavoytskiy, V. I., Glushtshov, M. V.

TITLE: The effect of rare-earth elements on flake sensitivity of structural  
alloyed steels

PERIODICAL: Metallurg, no. 12, 1961, 9-11

TEXT: There are only few data available on the effect of rare-earth  
elements on hydrogen behavior in iron and steel and the resulting defects. To  
complete these data, workers of the Moscow Steel Institute and the "Krasnyy  
Oktyabr'" Plant carried out a series of laboratory and industrial melts. They  
were assisted by L. N. Permyakov, M. P. Lapshova, O. D. Petrenko, V. G. Volnyan-  
skiy, G. R. Opanchevich, V. A. Grigor'yev and V. P. Bondarev. They studied the  
effect of the amount of rare-earth elements (0.3 and 0.5%) on hydrogen solubility  
in iron and the effect of the temperature on hydrogen solubility in alloys with  
20% and more of these elements. The results have shown that it cannot be expected  
that rare-earth elements in the given amounts will eliminate defects of the  
steel; on the other hand, the increasing hydrogen sorption capacity at lower

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S/130/61/000/012/002/006  
A006/A101

The effect of rare-earth elements ...

temperatures of alloys containing these elements leads to the expectation that they will bind the hydrogen liberated during the cooling of metal and prevent flake formation. These results were checked by the experimental melting of 37XG (37KhS), 38XCA (38KhSA) and 36Г2С (36G2S) steels containing 6.3 - 8.0 cm<sup>3</sup>/100 g hydrogen, ferrocerium with 94 - 96% Ce, misch metal with 45 - 55% Ce, 25 - 30% La and up to 15% other rare-earth elements. Ingots were heated for 4 - 6 hours at 1,150 - 1,180°C in blooming pits and rolled into 400 - 500 mm air-cooled specimens, which were subjected to breaking tests and etching to establish their flake sensitivity. Results obtained are given in a table and show that the addition of rare-earth elements in amounts exceeding 2.7 kg/t prevent flake formation in 37KhS and 36G2S steel even in profiles of 195 - 225 mm section, under the condition that individual blooms be air-cooled. The experiment has shown that rapid cooling of the blooms will be possible due to the use of rare-earth elements. This will entail a number of economical and technical advantages. There are 1 table and 2 figures.

Card 2/2

KUDRIN, V.A.; AFONIKOV, S.M.; NECHKIN, Yu.M.; SOROKIN, S.P.; TYURIN, Ye.I.;  
IAPSHOVA, M.P.; YUDSON, A.A.; POPOV, I.S.

Performance of a 30 ton open-hearth furnace with a roof gas  
and oxygen burner. Metallurg 10 no.1:14-16 Ja '65.

(MIRA 18:4)

TIMOFEYEV, N.N.; ANOKHINA, A.D.; SOROKIN, S.P.; DROZHEVSKIY, N.P.;  
GLUSHTSOV, M.V.; LARIONOV, A.S.; KOZLITIN, G.I.

Block lining of the upper structure of open-hearth furnaces.  
Ogneupory 30 no.11:8-10 '65. (MIRA 18:11)

1. Vsesoyuznyy institut ogneuporov (for Timofeyev, Anokhina).
2. Volgogradskiy metallurgicheskiy zavod "Krasnyy Oktyabr"  
(for Sorokin, Drozhevskiy, Glushtsov, Larionov, Kozlitin).